

OC4610 - WAVE AND SURF PREDICTION

LAB #2 – January 29, 2004

I. INTRODUCTION/BACKGROUND

In this lab we will use the pressure data we processed last week in conjunction with other wave and meteorological data collected during Hurricane Gordon to: 1) examine the spatial and temporal changes in wave characteristics during the storm and 2) compare these observations with model predictions.

II. ADDITIONAL DATA

Additional data collected in and around Duck, NC during Hurricane Gordon to which you will have access include: the spectral data from the other pressure sensor sites, barometric pressure, wind speed and direction, and hurricane tracking information. Additionally, Table 1 and 2 present the WAM predictions from two grid points near the experiment site.

The spectral plots from last weeks lab may be found on the Ocean Wave Lab's web site at: <http://www.oc.nps.navy.mil/wavelab>. Follow the link to Courses->OC4610->Labs->Lab1 Figures. The additional atmospheric and hurricane track data are also available on the web site.

III. LAB GOALS/REQUIREMENTS

Each student will be responsible for the following:

- 1) Using the data from the site you were assigned last week along with the spectral data from the other sites, produce plots of significant wave height (H_S) and peak period (T_P) vs. distance offshore at: 11/17:1300, 11/18:0700 (the peak of the storm), and 11/19:0700. See Table 3 for distance information.
- 2) Make a plot of the WAM predictions and site G measurements of H_S vs. time. Do the same for T_P (see Tables 1 and 2)

Using the above plots, the supplementary data supplied, and the spectral data from all available sites answer the following questions:

- 1) Where and when do the highest waves occur?
- 2) Do the highest waves occur at all sites at the same time? If not describe any pattern you see.
- 3) How did the significant wave height (H_S) and peak period (T_P) change spatially across the shelf during the peak of the storm?
- 4) How does the WAM data compare with the data from site G during the hurricane?

You may find it helpful to create additional plots to answer some of the above questions. Try to relate your observations to the additional meteorological data provided.

Each student should turn in: 1) the plots from this and last weeks lab, 2) a copy of the matlab m-file used to produce those plots, and 3) answers to the above questions.

Table 1 - Time, significant wave height (H_s), peak wave period (T_p), and direction for WAM data from the point located at 35° N. 75° W.

Time(EST)	H_s(m)	T_p(sec)	Direction(from)
11/16:2000	2.0	7.5	133
11/17:0800	3.6	8.6	059
11/17:2000	6.3	10.9	072
11/18:0800	6.6	12.4	096
11/18:2000	4.8	10.9	098
11/19:0800	3.1	10.9	101
11/19:2000	3.7	7.5	013

Table 2 - Time, significant wave height (H_s), peak wave period (T_p), and direction for WAM data from the point located at 37° 30' N. 75° W.

Time(EST)	H_s(m)	T_p(sec)	Direction(from)
11/16:2000	3.2	7.5	069
11/17:0800	5.9	10.9	068
11/17:2000	5.6	12.4	081
11/18:0800	4.9	10.9	113
11/18:2000	4.7	12.4	125
11/19:0800	3.4	10.9	118
11/19:2000	3.0	10.9	005

Table 3 - Depth and Distance from shore for the DUCK94 pressure sensor sites.

SITE	DEPTH(M)	DISTANCE FROM SHORE (KM)
A	12	0.82
B	20.0	5.14
C	25.0	16.35
D	33.0	30.10
E	33.5	48.91
F	31.5	59.58
G	45.0	80.00
H	48.0	93.03
I	87.0	99.50